

## **I. AMENDMENTS TO THE CLAIMS**

Please find below a listing of claims that will replace all prior versions, and listings, of claims in the application:

1. (cancelled)
2. (previously presented) An optical switching system comprising:
  - a first layer for switching optical channels;
  - a second layer for switching a group of optical channels;
  - a first coupler for grouping together optical channels of the first layer and coupling them to the second layer;
  - a second coupler for ungrouping grouped optical channels of the second layer and coupling them to the first layer; and
  - a third coupler for combining the grouped optical channels of the second layer.
3. (previously presented) An optical switching system as claimed in claim 2 wherein the optical channels are lambdas.
4. (previously presented) An optical switching system as claimed in claim 2 wherein the group of optical channels is a lambda group.
5. (previously presented) An optical switching system as claimed in claim 4 wherein the first coupler includes a multiplexer for forming a lambda group from adjacent lambdas.
6. (previously presented) An optical switching system as claimed in claim 4 wherein the first coupler includes an interleaver for forming a lambda group from channel separated lambdas.

7. (previously presented) An optical switching system as claimed in claim 4 wherein the second coupler includes a demultiplexer for forming adjacent lambdas from lambda groups.
8. (previously presented) An optical switching system as claimed in claim 4 wherein the first coupler includes a deinterleaver for forming channel separated lambdas from lambda groups.
9. (previously presented) An optical switching system as claimed in claim 2 wherein the second layer for switching grouped optical channels includes an optical plane switch.
10. (previously presented) An optical switching system as claimed in claim 9 wherein the optical plane switch includes a four-port MEMS.
11. (previously presented) An optical switching system as claimed in claim 9 wherein the optical plane switch includes a six-port MEMS.
12. (previously presented) An optical switching system as claimed in claim 2 wherein the first layer for switching optical channels includes a plurality of optical plane switches.
13. (previously presented) An optical switching system as claimed in claim 12 wherein one of the optical plane switches includes a four-port MEMS.
14. (previously presented) An optical switching system as claimed in claim 12 wherein one of the optical plane switch includes a six-port MEMS.
15. (previously presented) An optical switching system as claimed in claim 12 wherein each of the optical plane switches includes a four-port MEMS.

16. (previously presented) An optical switching system as claimed in claim 12 wherein each of the optical plane switches includes a six-port MEMS.
17. (cancelled)
18. (previously presented) An optical switching system as claimed in claim 2 including a third layer for switching combined grouped optical channels.
19. (previously presented) An optical switching system as claimed in claim 18 wherein the third layer includes a first plurality of input ports for coupling to optical fibers.
20. (previously presented) An optical switching system as claimed in claim 18 wherein the third layer includes a first plurality of output ports for coupling to optical fibers.
21. (previously presented) An optical switching system as claimed in claim 18 wherein the second layer includes a plurality of output ports for coupling to the second coupler.
22. (previously presented) An optical switching system as claimed in claim 18 wherein the first layer includes a plurality of input ports for coupling to the second coupler.
23. (previously presented) An optical switching system as claimed in claim 18 wherein the second layer includes a plurality of input ports for coupling to the first coupler.
24. (previously presented) An optical switching system as claimed in claim 18 wherein the first layer includes a plurality of output ports for coupling to the first coupler.

25. (previously presented) An optical switching system as claimed in claim 2 wherein the first coupler includes an optical amplifier for compensation for losses within the first layer and the first coupler.
26. (previously presented) An optical switching system as claimed in claim 2 wherein the second coupler includes an optical amplifier for compensation for losses within the second layer and the second coupler.
27. (cancelled)
28. (currently amended) An optical switching system as claimed in claim [[27]] 38 wherein the second logical layer for switching grouped optical channels includes a first optical plane switch.
29. (previously presented) An optical switching system as claimed in claim 28 wherein the optical plane switch includes a four-port MEMS.
30. (previously presented) An optical switching system as claimed in claim 28 wherein the optical plane switch includes a six-port MEMS.
31. (currently amended) An optical switching system as claimed in claim [[27]] 38 wherein the first logical layer for switching optical channels includes a plurality of optical plane switches.
32. (currently amended) An optical switching system as claimed in claim [[31]] 28, wherein the first logical layer for switching optical channels includes a plurality of optical plane switches, wherein one of the plurality of optical plane switches includes including the first optical plane switch.
33. (currently amended) An optical switching system as claimed in claim [[27]] 38

wherein the first coupler includes an optical amplifier for compensation for losses within the first logical layer and the first coupler.

34. (currently amended) An optical switching system as claimed in claim ~~[[27]]~~ 38 wherein the second coupler includes an optical amplifier for compensation for losses within the second logical layer and the second coupler.
35. (original) An optical switching system for switching optical signals in wavelength groups, the system comprising:
- a first optical switching matrix having multiple inputs and multiple outputs and being operable to switch a composite optical signal composed of a plurality of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
  - at least one first wavelength division demultiplexer coupled at its input to an output of the first optical switching matrix for dividing a composite optical signal into groups of optical channel signals;
  - a plurality of second optical switching matrices each matrix having multiple outputs and multiple inputs at least one of which is coupled to a respective output of the first wavelength division demultiplexer, each matrix being operable to switch a group of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
  - at least one first wavelength division multiplexer coupled at each of its inputs to an output of a respective one of the plurality of second optical switching matrices and coupled at its output to one of the inputs of the first optical switching matrix;
  - a plurality of second wavelength division demultiplexers each coupled at its input to an output of a respective one of the plurality of second optical switching matrices for dividing a group of optical channel signals into optical channel signals;
  - a plurality of third optical switching matrices each matrix having multiple outputs and multiple inputs at least one of which is coupled to a respective

output of a respective one of the plurality of second wavelength division demultiplexers, each matrix being operable to switch an optical channel signal from any one of a plurality of the inputs to anyone of a plurality of the outputs; and

- a plurality of second wavelength division multiplexers, each second multiplexer coupled at each of its inputs to an output of a respective one of the plurality of third optical switching matrices for combining optical channels into a group of optical channels and coupled at its output to one of the inputs of a corresponding one of the plurality of second optical switching matrices.

36. (previously presented) An optical switching system for switching optical signals in wavelength groups, the system comprising:

- a first optical switching matrix having multiple inputs and multiple outputs and being operable to switch a composite optical signal composed of a plurality of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
- at least one first wavelength division demultiplexer coupled at its input to an output of the first optical switching matrix for dividing a composite optical signal into groups of optical channel signals;
- a plurality of second optical switching matrices each matrix having multiple outputs and multiple inputs, at least one of which is coupled to a respective output of the first wavelength division demultiplexer, each matrix being operable to switch a group of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
- at least one first wavelength division multiplexer coupled at each of its inputs to an output of a respective one of the plurality of second optical switching matrices and coupled at its output to one of the inputs of the first optical switching matrix;
- a plurality of second wavelength division demultiplexers each coupled at its input to a corresponding output of the first wavelength division

demultiplexer for dividing a group of optical channel signals into optical channel signals;

- at least one third wavelength division demultiplexer coupled at its input to an output of the first optical switching matrix for dividing a composite optical signal into optical channel signals;
- a plurality of third optical switching matrices each matrix having multiple outputs and multiple inputs at least one of which is coupled to a respective output of a corresponding second wavelength division demultiplexer and at least one of which is coupled to a respective output of the third wavelength division demultiplexer, each matrix being operable to switch a group of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
- a plurality of second wavelength division multiplexers, each multiplexer coupled at each of its inputs to an output of a respective one of the plurality of third optical switching matrices for combining optical channels into a group of optical channels and coupled at its output to one of the inputs of a corresponding one of the plurality of second optical switching matrices; and
- at least one third wavelength division multiplexer coupled at each of its inputs to an output of a respective one of the plurality of third optical switching matrices and coupled at its output to one of the inputs of the first optical switching matrix.

37. (currently amended) An optical switching system for switching optical signals in wavelength groups, the system comprising:

- a first optical switching matrix having multiple inputs and multiple outputs and being operable to switch a composite optical signal composed of a plurality of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
- at least one first wavelength division demultiplexer coupled at its input to an output of the first optical switching matrix for dividing a composite

- optical signal into groups of optical channel signals;
- a plurality of second optical switching matrices each matrix having first and second inputs and first and second outputs, wherein the first input is coupled to a respective output of the first wavelength division demultiplexer, each matrix having first and second switch states, in the first state the first input is connected to the first output and in the second state the first input is connected to the second output and the second input is connected to the first output;
  - a plurality of second wavelength division demultiplexers each coupled at its input to the second output of a corresponding one of the plurality of second optical switching matrices for dividing a group of optical channel signals into optical channel signals;
  - a plurality of third optical switching matrices each matrix having multiple outputs and multiple inputs, a subset of the inputs being coupled to respective outputs of corresponding ones of the plurality of second wavelength division demultiplexers, each matrix being operable to switch a group of optical channel signals from any one of a plurality of the inputs to any one of a plurality of the outputs;
  - at least one first wavelength division multiplexer coupled at each of its inputs to an output of a respective one of the plurality of second optical switching matrices and coupled at its output to one of the inputs of the first optical switching matrix; and
  - a ~~[[first]]~~ plurality of second wavelength division multiplexers~~[[,]]~~ each ~~multiplexer~~ coupled at each of its inputs to an output of a respective one of the plurality of ~~second~~ third optical switching matrices for combining optical channels into a group of optical channels and coupled at its output to one of the inputs of a corresponding one of the ~~[[first]]~~ plurality of second optical switching matrices.

38. (currently amended) An optical switching system ~~as claimed in claim 27~~ comprising:



- a first logical layer for switching optical signals;
- a second logical layer for switching a group of optical channels;
- a first coupler for grouping together optical channels of the first logical layer and coupling them to the second logical layer;
- a second coupler for ungrouping grouped optical channels of the second logical layer and coupling them to the first logical layer; and
- a third coupler for combining grouped optical channels of the logical second layer.